ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Pharmaceutical Chemistry and Pharmaceutical Analysis

Title of diploma thesis: Synthesis of thiazolidine-2,4-dione derivatives as potential drugs I

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The theoretical part of this diploma thesis summarizes the biological activity of thiazolidine-2,4-dione derivatives, focused mainly on their antibacterial, antimycobacterial and antifungal effects. The theoretical part shows that thiazolidine-2,4-dione derivatives are substances that have great potential to become good candidates for new drugs that are needed to be obtained due to the growing bacterial resistance to existing drugs. Thiazolidine-2,4-dione derivatives are already used in clinical practice as oral antidiabetics – pioglitazone and rosiglitazone.

In the experimental part, I dealt with a three-step synthesis of (2,4-dioxothiazolidin-3-yl) acetic acid derivatives, which, however, was not succesful to prepare except for one product. This was followed by the synthesis of thiazolidine-2,4-dione derivatives, which consisted of the Knoevenagel condensation of thiazolidine-2,4-dione with aromatic and heterocyclic aldehydes, in which we managed to obtain a total of eight products. All substances were characterized by melting point, IR and NMR spectra. The purity of the substances was verified by elemental analysis, for two products by HPLC.

The substances were tested *in vitro* for antibacterial, antimycobacterial and antifungal activity. The organisms examined included eight strains of gram-positive and gram-negative bacteria and eight strains of fungi and yeasts. So far, testing of the inhibitory activity of the substances has been performed only on non-pathogenic mycobacteria and avirulent *M. tuberculosis* H37Ra.

The compounds showed moderate activity against the three mycobacterial strains tested and weak activity against some other bacterial and fungal strains.

The substances were also compared with the isosteric group of antibacterially active rhodanines.